Positive Research of Client-Server Interlock System for m-PACS Service in Wireless Mobile Environment

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무선이동환경에서 m-PACS 서비스를 위한 클라이언트-서버 연동시스템의 실증적연구

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Abstract

J2ME service technology has advantage that can embody independent and, more soft system in DICOM 3.0 and medicine reflex administration server, client's OS that is medical treatment reflex standard in radio Internet. Also, intranet that do web based spread, and develop by system that can alternate existent client-server structure rapidly. Specially, posibility of improvement is much because is connecting being limited in internet environment that medical equipment and information system of various kinds of machine are wire in medical institution and so on. Because do medical treatment reflex transmission module development applying DICOM technology and filtering techniques of "m-PACS" in this research, existence, by interlock in radio usable Mobile reflex conversion system design and embody. That is, patient's information which is stored to various systems to be transmited and can give big help in medical examination and treatment to reflex client without being wooed doctor's interpretation result and so on in place through environment to be radish tentacle bar see

Ⅰ. Introduction

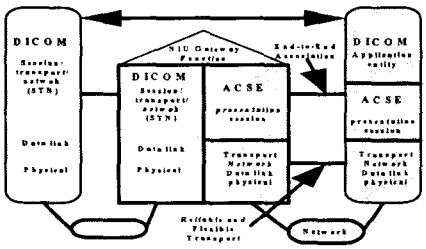
As Internet is generalized, Wireless Internet that is represented by portability and mobility is generalized, and these substance becomes various.. However, WLL service or radio data service that use IS 95 standards had existed past and fixed wireless local area network in mobility side, is divided by available transfer style radio data service outside the room. Wireless internet invented depend in demand that require information retrieval, E-Mail send-receive, ticket advance purchase etc.. While consumer plain moves, but take 21th century and two shafts of Information-Communication technology are internet and radio communication. [1],[5]

PACS that can prevent loss and breakdown that existent film system is problem that have supplementing HIS's function that is based on character information can store patients' film systematically and keep, and teleconsultation procedure very simplification because get worn out in case of advanced nation major hospitals since the 80s operate . Bit map (bitmap) way and vector (vector) image way according to data type that wireless medical treatment reflex transmission service offers of dichotomise . Bit map way is method to be called and create image from medical treatment reflex database in server is raster method or transmit image of question area by client just as it is from database is Uiryoimi. Third, by capacity within that bandwidth permits, need techniques to do to reduce data. Because this treatise uses PSNR (Peak Signal Noise Ratio) techniques etc.. by system that is effective and design medical treatment image service system for patient's diagnosis and efficiency elevation through reflex that is transmited in necrophilia of full text and embody DICOM3.0 file format that is existent PACS system and medical treatment reflex standard, data compression / reconstruct, and have created image which can recognize in small output display, and take advantage of Filtering techniques and reduce data by permission capacity within of resources and bandwidth

Ⅱ. Background research

Implementation of medical treatment reflex transmission service can divide to WAP bedrock and JAVA bedrock. Lately,

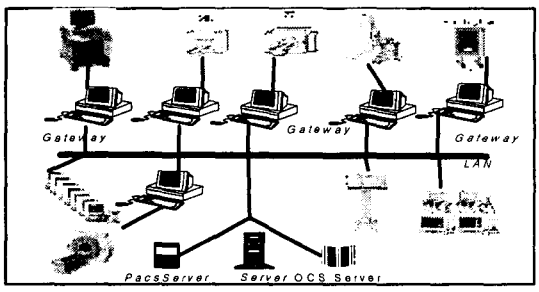
transfer is jumpy by JAVA base service such as database interlock that use animation processing, RMI, breakup object that use CORBA, servlet or development that use JSP, JDBC including component. AWT & did so that may can create GUI (graphic user interface) according to relevant platform in Java program taking advantage of SWING technology, and offer superior graphic function as box so that can do graphic work directly on screen in all screen API (full-screen exclusive mode application programming interface.



[Fig.1] Dicom protocol

Communication method based on web, data transmitting mode DICOM rules user environment selects WWW Eodiseonji simply medical treatment data search can. Main computer installed server that do TCP/IP by standard communication rule because do UNIX that is based on PC in operation form and does Ethernet all and connected to Internet. Used scanner to equipment that acquire film or picture that can not get directly in medical equipment on Local computer, and used film recorder, CD record by do storage chapter. DICOM defines data of other form, of reflex service in computer network. Service that is defined in DICOM is thing and so on about study administration, report administration, reflex storage, reflex print.

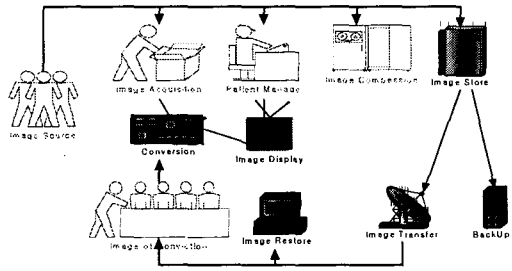
Ⅲ. Image processing model



[Fig.2] Whole flowchart

System PACS can refer medical treatment premier of mass digital High Resolution through computer and network does server, network, storage chapter, there is terminal, monitor, Viewing that refer premier server program and terminal that acquire and compress and divide reflex and, there is database that manage. Index information and examination of reflex and patient connection information. PACS composition in systematic aspect can divide at reflex acquisition department, reflex storage department, zero-phase-sequence component distribution, reflex inquiry department, reflex compressed workweek, storage. Composed in Window 2000 environments that is GUI's Operating System to embody sailing on the same vessel health order PACS applied under PC base in this research. Visual C++ and Database of language that use are FoxPro for extensity of program and link sex, database for server used Oracle program.

Sailing on the same vessel health order PACS's schematic diagram that embody in this research is same with figure 5. Sailing on the same vessel health order PACS that is composed with figure 5 composed to apply other server or Lord .



[Fig.3 Image processing route

Figure 3 is as following if describe health order PACS's function curtly. Achieve input function from scanner etc.. in reflex acquisition department. Patient administration wealth patient's Korea information visual display wealth function and edit, conversion, Hwakde, graphic function of reduction and so on that prove image taking advantage of various image processing techniques achieve .

3.1 Image acquisition department

DICOM Gateway is equipment that act role that convert reflex data of equipment that do not support standard DICOM by digital. Compose by Digital gateway that convert secondary capture that make video signal output such as supersonic waves to digital data usually and digital data that is stored on computer of equipment by standard DICOM. DICOM gateway classifies by some of photographing equipment and classifies by part of PACS's component.

3.2 Image compression and storage department

As well as high accuracy vs resolution of medicine reflex is required than general reflection, because the data amount is much with CT, MRI etc.., necessity of reflex compression is high. CT has 512 Kbytes' the data amount per reflex because have 12 bit per 512*512 elemental area's matrix and elemental area. Compression in Dept. of Department of Radiology or presence at a sickbed medical examination and treatment

course that must refer many premiers frequently can shorten doctor's latency time and this acts role that do as can spare more times in medical examination and treatment.

3.3 Transmission and image indication department

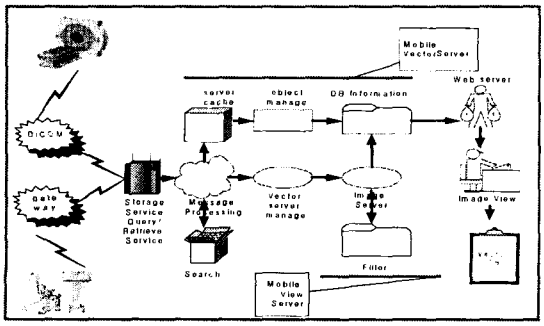
Kinds of machine that stability can be secured of PACS terminal has to be chosen. Stability and Performance excel and maintenance prefers stable PC after four. Size of memory is much connections with Performance in PACS terminal and PACS monitor is divided by special procurements monitor for interpretation and monitor for presence at a sickbed, reflex output by film printer and paper printer be

3.4 Do storage chapter and database

Divide by do short term storage chapter greatly do storage chapter and do long time storage chapter. It is place that store reflex file that do so that can inquire PACS's data in terminal justly by on-line through network does short term storage chapter. Store view data of patient, indeed, ward inpatient or patient who become foreign promise etc. that find anytime do short term storage chapter. Used information interchange with reflex output equipment and HIS (Hospital Information System), RIS (Radiology Information System) that is linked search of quality and network about patient's examination informations which transmit picture by DICOM protocol in PACS system and so on and DICOM Network Esau selected TCP/IP, OSI7 Layer and propose diagnosis reflex relay model "M-PACS" (mobile-Picture Arching and Communication System) that can solve these problem. Also, decode dataset that follow DICOM Decoding DICOM standard and draw picture and various informations. That is multiframe that support picture and offer animation connection function. ACR-NEMA 1 and ACR-NEMA 2 do not support in qualification. Support DICOM 3.0. Although Photometric Interpretation (0028, 0004) is 10 all by method that express reflex pixel data in DICOM but developed library goes monochrome1, monocrome2, palette color, RGB 4, support. JPEG reflex draw nothing but decoding function support. Must appropriate special Jpeg library to display abstracted JPEG reflex.

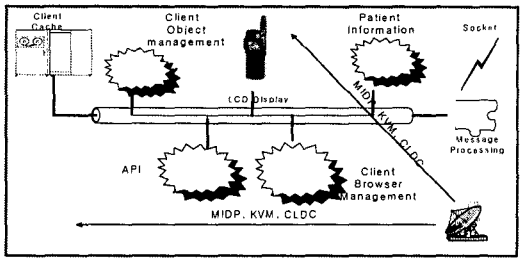
Ⅳ. Design and implementation of system

4.1 Structure of system



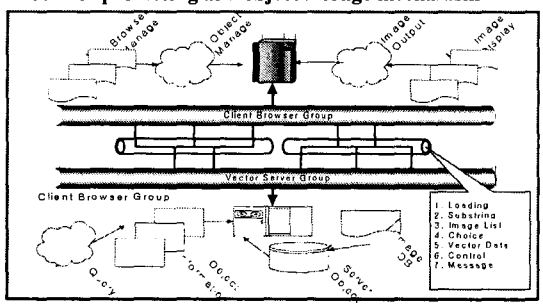
[Fig.4] Whole processing flowchart

System structure for Mobile vector medical treatment reflex service that design in this treatise and present can divide to two groups. Firstly, vector data that is transmited from server secondarily with Mobile vector group which transmit by client collecting vector data from DICOM protocol etc.. Mobile vector client group which display medical treatment reflex on screen of client radio terminal be



[Fig.5] Patient data processing

4.2 Service processing and object storage mechanism



[Fig.6] Client browser & vector server

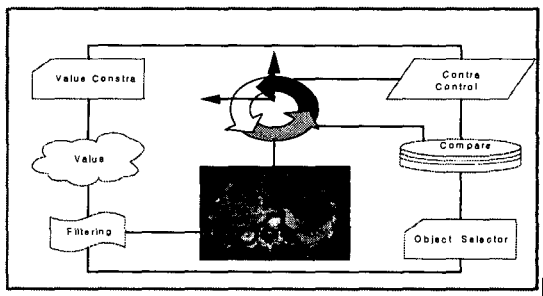


Fig.7] Filtering route

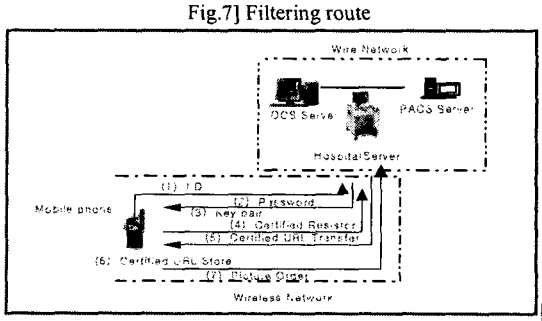
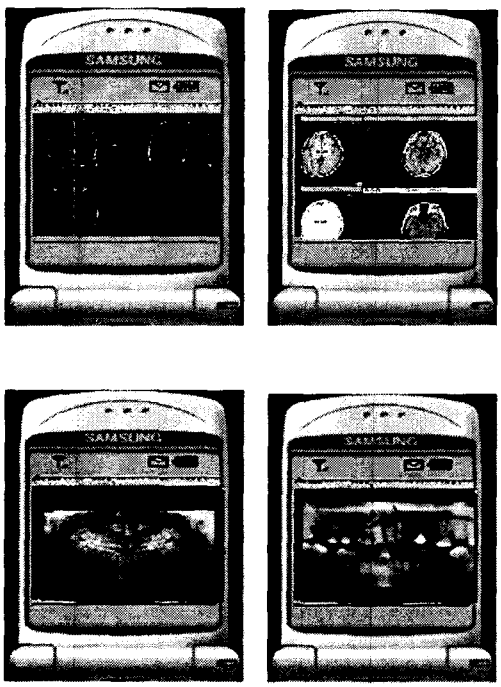


Fig.8] Mobile phone based certified

Mobile vector group and client group's system processing mechanism that design in this treatise are same with figure 11. If application program is loaded to radio terminal first time, client patient's information which user wishes to search if is output anger of terminal resolution to server transmit. Pacs in pacs www environment in world wide web environment I with pc-based relationship micro pacs [1] differentiate. Because existent pacs must install special exclusive use terminal or exclusive client program to get information that want, can solve such problem in hospital or because use pacs mediocrity web browser that increase in www environment although hospital nursing shout of joy, problems of expense happens. Process of inforamtion services flows subsequent process. Web server Ro's request happens in 1.web browser. Execute PACS client that is made out to 2.web server a CGI. 3.PACS client gouges PACS server that increase and request information. 4. pacs server does data encording from DB.



[Fig.9] Communication simulator pictures

V. Conclusion

Could realize user administration who do more convenient connection environment and Wonhal as that embody remote medical examination and treatment and reflex data to be run in radio internet browser. Web server manages connection information of connecters as destroyer and service competence and service connection can arbitrate . Active Xs that embody are and have extensity is applied to alien system as control that usability is very high. There was this research applies various image processing technique through network in DICOM reflex without correcting PACS data. Also, improvement was problem that process picture that come over CT Console Esau and stores making UID as is different when store again by DICOM Eu processing late.

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